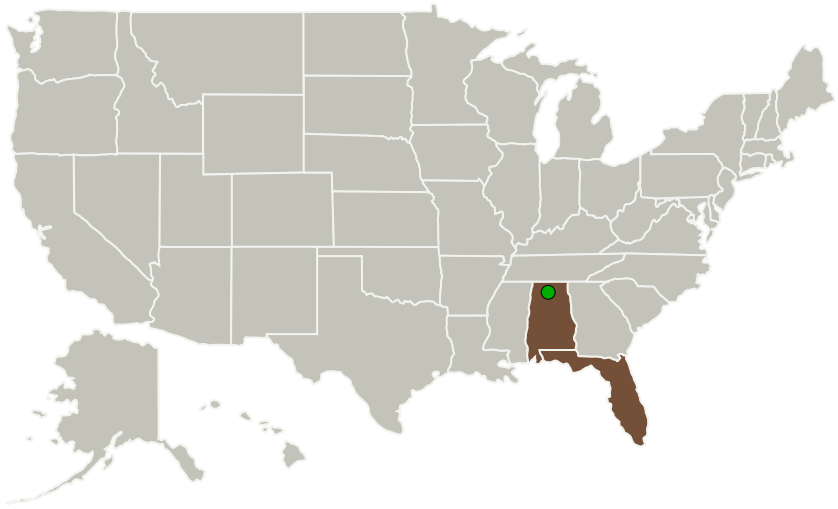
A Low Cost High Specific Stiffness Mirror Substrate, Phase I

Completed Technology Project (2011 - 2012)

Project Introduction

The primary purpose of this proposal is to develop and demonstrate a new technology for manufacturing an ultra-low-cost precision optical telescope mirror which can be scaled up for use in very large UV/optical and/or infrared telescopes. This proposal will demonstrate prototype manufacturing of a precision mirror in the 0.25 to 0.5 meter class, with a specific scale up roadmap to 1 to 2+ meter class system which can be rated for space flight. Material behavior, processing parameters, optical performance, and mounting techniques will be demonstrated. The potential for scale-up will be addressed from a processing and infrastructure point of view. The Phase 1 deliverable will be a 0.25 meter proof-of-concept mirror. Its optical performance assessment and all data on the processing and properties of its substrate material will be determined. UMS proposes to demonstrate the feasibility of forming a polymer derived 'bulk ceramic' mirror substrate with a 'fully dense' optical surface. This mirror substrate with fully dense surface, will be optically figured, polished and coated with a reflective metal system typically used in a commercial terrestrial telescope.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
United Materials and Systems	Lead Organization	Industry	Orlando, Florida
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Florida

Project Transitions

February 2011: Project Start

February 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137825)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

United Materials and Systems

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

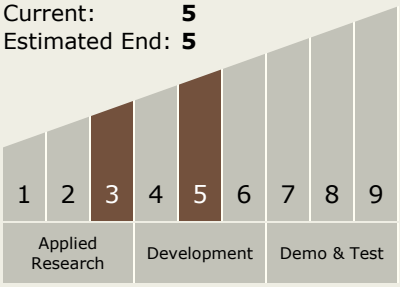
Carlos Torrez

Principal Investigator:

Mark Tellam

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.2 Observatories
    - TX08.2.1 Mirror Systems

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System